

## Claims

- [c1] 1. A combustion exhaust catalyst support adapted to hold an exhaust catalyst in an exhaust system, the support comprising:  
a flexible refractory mat having a first surface and a second surface, the flexible refractory mat adapted to surround the exhaust catalyst with the first surface being adjacent to a surface of the exhaust catalyst; and  
a metal foil having a plurality of protrusions, the metal foil disposed over the second surface of the flexible refractory mat.
- [c2] 2. The support of claim 1 wherein the plurality of protrusions comprise a plurality of ridges and grooves such that the metal foil is corrugated.
- [c3] 3. The support of claim 1 wherein the plurality of protrusions comprise a plurality of dimples.
- [c4] 4. The support of claim 1 wherein the metal foil comprises a metal selected from the group consisting of stainless steels, nickel alloys, and cobalt alloys.
- [c5] 5. The support of claim 4 wherein the metal foil comprises a metal selected from the Monels, Hastelloys, In-

conels, 300 series stainless steel's, and 400 series stainless steel's.

- [c6] 6. The support of claim 1 wherein the metal foil is between about 0.01 millimeters to about 0.5 millimeters thick.
- [c7] 7. The support of claim 1 wherein the metal foil is between about 0.01 millimeters to about 0.2 millimeters thick.
- [c8] 8. The support of claim 1 wherein the refractory mat comprises refractory ceramic fiber and a binder.
- [c9] 9. The support of claim 1 wherein the refractory mat is adapted to surround an exhaust catalyst comprising a refractory brick having a longitudinal axis, a surface substantially parallel to the longitudinal axis, a front surface, and a back surface, the refractory brick comprising a series of channels substantially parallel to the longitudinal axis which pass through the refractory brick.
- [c10] 10. The support of claim 9 wherein the first surface of the refractory mat is adjacent to the surface substantially parallel to the longitudinal axis.
- [c11] 11. The support of claim 10 wherein the refractory brick has a substantially circular or substantially elliptical

cross-section.

- [c12] 12. The support of claim 1 wherein the metal foil includes a first end with a metal foil notch and a second end with a metal foil protrusion and the refractory mat includes a first end with a refractory mat notch and a second end with a refractory mat protrusion wherein the metal foil notch and metal foil protrusion are adapted to mate together and the refractory mat notch and refractory mat protrusion are adapted to mate together so that the support when placed around the exhaust catalyst is held in place.
- [c13] 13. An exhaust system comprising:
  - an exhaust catalyst;
  - a flexible refractory mat having a first surface and a second surface, the flexible refractory mat surrounding the exhaust catalyst with the first surface being adjacent to a surface of the exhaust catalyst; and
  - a metal foil having a plurality of protrusions, the metal foil disposed over the second surface of the flexible refractory mat.
- [c14] 14. The exhaust system of claim 13 wherein the plurality of protrusions comprise a plurality of ridges and grooves such that the metal foil is corrugated.

- [c15] 15. The exhaust system of claim 13 wherein the plurality of protrusions comprise a plurality of dimples.
- [c16] 16. The exhaust system of claim 13 wherein the exhaust catalyst comprises a refractory brick having a longitudinal axis, a surface substantially parallel to the longitudinal axis, a front surface, and a back surface, the refractory brick comprising a series of channels substantially parallel to the longitudinal axis which pass through the refractory brick.
- [c17] 17. The exhaust system of claim 16 wherein the first surface of the refractory mat is adjacent to the surface substantially parallel to the longitudinal axis.
- [c18] 18. The exhaust system of claim 17 wherein the refractory brick has a substantially circular or substantially elliptical cross-section.
- [c19] 19. The exhaust system of claim 13 wherein the metal foil includes a first end with a metal foil notch and a second end with a metal foil protrusion and the refractory mat includes a first end with a refractory mat notch and a second end with a refractory mat protrusion wherein the metal foil notch and metal foil protrusion are adapted to mate together and the refractory mat notch and refractory mat protrusion are adapted to mate to-

gether so that the support when placed around the exhaust catalyst is held in place.

- [c20] 20. The exhaust system of claim 13 wherein the metal foil comprises a metal selected from the group consisting of stainless steels, nickel alloys, and cobalt alloys.
- [c21] 21. The exhaust system of claim 16 wherein the metal foil comprises a metal selected from the Monels, Hastelloys, Inconels, 300 series stainless steel's, and 400 series stainless steel's.
- [c22] 22. The exhaust system of claim 13 wherein the metal foil is between about 0.01 millimeters to about 0.5 millimeters thick.
- [c23] 23. The exhaust system of claim 13 wherein the refractory mat comprises refractory ceramic fiber and a binder.
- [c24] 24. A method of supporting an exhaust catalyst, the method comprising:
  - placing a flexible refractory mat having a first surface and a second surface over a surface of an exhaust catalyst wherein the first surface is adjacent to the surface of the exhaust catalyst;
  - placing a metal foil having a plurality of protrusions over the second surface of the refractory mat to form a catalyst-support combination; and

securely placing catalyst-support combination within a metal tube, the metal tube adapted to be placed within an exhaust system.

- [c25] 25. The method of claim 24 wherein the plurality of protrusions comprise a plurality of ridges and grooves such that the metal foil is corrugated.
- [c26] 26. The method of claim 24 wherein the plurality of protrusions comprise a plurality of dimples.
- [c27] 27. The method of claim 24 wherein the catalyst-support combination is placed with a metal tube by sliding the catalyst-support combination in the metal tube and then swaging down on the metal tube until the catalyst-support combination is held in place.
- [c28] 28. The method of claim 24 wherein the metal tube have a pair of flanges and the catalyst-support combination is placed with a metal tube positioning the catalyst-support combination in the metal tube, compressing the metal tube so that the pair of flanges come in contact, and sealing the pair of flanges together.
- [c29] 29. The method of claim 24 wherein the metal tube comprises a first tube half and a second tube half so that the catalyst-support combination is placed in the metal tube by positioning the catalyst-support combination in

a cavity formed by bringing the first tube half and the second tube half together.